BIO 1130FF

An introduction to Organismal biology
Midterm examination
Worth either 15% or 20% of your final grade

Saturday, November 13, 2010

Part A: Multiple choice questions
30 points (1 point/question)

a) Fill in the bubbles for your name and student number and BIO1130FF for the course code. Fill in the same information in text in the boxes above the bubbles.

b) Use only a pencil to fill in the answer sheet. If you erase a question be sure to erase all of the pencil mark. Don't place any marks anywhere on the sheet other than where the bubbles are for personal information or your answers.

c) Do not place any answers on the question sheet.

d) This is not an open book exam.

e) **CAUTION to minimize paper waste this part of the exam has been printed back to back**

f) **You do not need a calculator for this exam**

NOTE: If you do not fill in the student number and course code as **BIO1130FF** it will be impossible to identify your answer sheet and you will receive a **ZERO** for this part of the exam

1.1A lophophore is used by bryozoans
a. For locomotion
b. In the larval stage of the life cycle
c. For feeding
d. For sensory perception
e. As a skeletal system

1.2 Which of the following is not a feature of the tube-within-a-tube body plan in most animals?
a. Typically, the outer tube consists of a hard exoskeleton.
b. The inner tube consists of digestive organs.
c. Typically, the mouth and anus form the ends of the inner tube.
d. The two "tubes" are separated by mesoderm tissue.

1.3 Which of the following traits do archaeans and bacteria share?
1. composition of the cell wall
2. presence of plasma membrane
3. lack of a nuclear envelope
4. identical rRNA sequences

a. 2 and 4
b. 3 only
c. 2 and 3
d. 1 and 3
e. 1 only

1.4 According to the endosymbiotic theory, why was it adaptive for the larger (host) cell to keep the engulfed cell alive, rather than digesting it as food?
a. The host cell was able to survive anaerobic conditions with the engulfed cell alive.
b. The engulfed cell provided the host cell with ATP.
c. The engulfed cell provided the host cell with carbon dioxide.
d. The engulfed cell allowed the host cell to metabolize glucose.
e. The host cell would have been poisoned if it had digested the engulfed cell.

1.5 An organism that obtains its carbon from CO_2 is a(n)
a. chemotroph.
b. autotroph.
c. heterotroph.
d. auxotroph.

1.6 Four of the five processes below are components of natural selection. Select the EXCEPTION.
a. genetic drift
b. genetic variation
c. limitations in vital resources
d. differential reproductive success
e. overproduction of offspring

1.7 In a Hardy-Weinberg population with two alleles, A and a, that are in equilibrium, the frequency of the allele a is 0.4. What is the percentage of the population that is homozygous for this allele?
a. 4
b. 36
c. 40
d. 16
e. 32

1.8 In bacterial transformation, cells
a. make replicate copies of one another.
b. take up pieces of DNA that are released as other cells disintegrate.
c. take up pieces of DNA through infection of a virus.
d. replicate DNA molecules.

1.9 In terms of food capture, which sponge cell is most similar to the cnidocyte of a Cnidarian?
a. choanocyte
b. epidermal cell
c. gamete
d. zygote
e. pore cell

1.10 What is the major goal of cellular respiration?
a. supply cell with fixed carbon
b. generate O_2
c. produce ATP
d. reduce an electron acceptor molecule
e. All of the above answers apply.

1.11 Which free-living cells were the earliest contributors to the formation of Earth's oxidizing atmosphere?
a. endosymbionts
b. mitochondria
c. seaweeds
d. cyanobacteria
e. chloroplasts

1.12 Which is one of the main energy transformers of cells?
a. Golgi apparatus
b. lysosome
c. peroxisome
d. vacuole
e. mitochondrion

1.13 Members of the Mollusc class ____ have a pair of shells that are hinged together.
a. Polyplacophora
b. Cephalopoda
c. Bivalvia
d. Scaphopoda

1.14 Which structure is the site of the synthesis of proteins that may be exported from the cell?
a. rough ER
b. Golgi vesicles
c. lysosomes
d. tight junctions
e. plasmodesmata

1.15 Prokaryotes were split into two domains based on differences in
a. cell wall composition.
b. cell membrane properties.
c. rRNA sequences.
d. staining characteristics.

1.16 Protostomes with a unique layer of tissue called the mantle that may secrete a shell are part of which phylum?
a. Mollusca
b. Arthropoda
c. Annelida
d. Cnidaria
e. Echinodermata

1.17 Secondary endosymbiosis occurs when a
a. non-photosynthetic eukaryote engulfs a photosynthetic prokaryote.
b. photosynthetic eukaryote engulfs a photosynthetic prokaryote.
c. photosynthetic eukaryote engulfs a non-photosynthetic prokaryote.
d. non-photosynthetic eukaryote engulfs a photosynthetic eukaryote.

1.18 The blastopore denotes the presence of an endoderm-lined cavity in the developing embryo, a cavity that is known as the
a. archenteron.
b. germ layer.
c. blastocoel.
d. blastula.
e. coelom.

1.19 The genome of prokaryotes consists of
a. many linear DNA molecules.
b. multiple circular DNA molecules.
c. a single DNA molecule that may be circular or linear, depending on the species.
d. a single linear DNA molecule.

1.20 The muscles of the body wall are derived mainly from which embryonic cell layer in most metazoans?
a. mesoderm
b. ectoderm
c. mesoglea
d. endoderm

1.21 The only survivors of a colony on Venus are a man and a woman, who happen to be both originally from southern Ukraine. Their descendants will show the effect of
a. excessive mutation.
b. punctuated equilibrium.
c. heterozygote advantage.
d. genetic drift.
e. frequency-dependent selection.

1.22 The protists are a diverse group of organisms that have traditionally been grouped together because they all
a. are not prokaryotes, fungi, plants, or animals.
b. have very similar DNA sequences.
c. have very similar shapes.
d. have the same type of nutrition.

1.23 The three domains of life are
a. Archaebacteria, Eubacteria, and Eukaryota.
b. Prokaryota, Eukaryota, and Protoctista.
c. Archaea, Bacteria, and Eukarya.
d. animals, plants, and microorganisms.

1.24 The width of a DNA double helix
a. is narrower where adenine is present than where cytosine is present.
b. is wider where purines are present than where pyrimidines are present.
c. varies randomly.
d. is constant.

1.25 Which of the following adds individual nucleotides to the 3' end of an existing strand to build a new DNA strand during DNA replication?
a. helicase
b. topoisomerase
c. DNA polymerase
d. primase

1.26 Which of the following describe(s) echinoderms?
a. They have an endoskeleton of hard calcareous plates.
b. Tube feet provide motility in most species.
c. They have a pseudocoelom.
d. They have an endoskeleton of hard calcareous plates, and tube feet provide motility in most species.
e. They have an endoskeleton of hard calcareous plates, tube feet provide motility in most species, and they have a pseudocoelom.

1.27 Which of the following includes the cyanobacteria?
a. photoheterotroph
b. photoautotroph
c. chemoheterotroph
d. chemoautotroph and photoheterotroph

1.28Which of these is the smallest unit upon which natural selection directly acts?
a. a population's gene frequency
b. an individual's genome
c. an individual's genotype
d. an individual's phenotype
e. a species' gene frequency

1.29 Cattle breeders have improved the quality of meat over the years by which process?
a. artificial selection
b. directional selection
c. stabilizing selection
d. artificial selection and directional selection
e. artificial selection and stabilizing selection

1.30 Cephalization is primarily associated with
a. method of reproduction.
b. fate of the blastopore.
c. adaptation to dark environments.
d. type of digestive system.
e. bilateral symmetry.

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Part B: Written questions

a) Place your name and student number in the space provided below. Be sure that your student number is on the top of each of the following pages – the exam will be separated. ONLY place your student number on the pages where indicated

b) Answer all questions in the space provided on the exam. Do not transfer answers to the back of the page.

c) You may use either pencil of ink for your answers.

d) Answers as written paragraphs are preferred but point form is acceptable as long as the points are logically organized and not random statements or facts

e) This is not an open book exam.

f) There are five pages including this one in part B of the exam, be sure you have all five pages.

g) Enter the multiple choice exam code in the space provided

h) **You do not need a calculator for this exam**

Name: _____

Student number: _____

Multiple Choice Exam Code: _____

●

12 pts Part 1. Briefly explain what each of the following terms means or the biological contribution made by the person. Where possible include an example in your explanation from a group or an organism to which the term or name applies.

Haplontic life cycle

Gram positive bacteria

Medusa

Stabilizing selection

26 pts Part 2: Fill in the missing word, or provide the one word answer in the space provided at the end of the sentence. If the line is missing, add it to the end of the line.

2.1 Mitochondria and chloroplasts have their own _____, suggesting they were once independent organisms.

2.2 This reinforcing biopolymer is unique to bacterial cells walls. _____

2.3 This nucleotide replace thymine in RNA. _____

2.4 These water filled membranous sacs are only found in plant cells. _____

2.5 These shales are famous for the fossilization of soft-bodied Cambrian animals. _____

2.6 These genes control pattern in multicellular organisms. _____

2.7 These fragments have to be stitched together to complete DNA replication. _____

2.8 The opposite of the codon. _____

2.9 Type of mutation where a single nucleotide changes alters only one codon. _____

2.10 The membrane system of the nucleus is only one part of this larger membrane system in cells. _____

2.11 The energy power houses of a cell. _____

2.12 Protozoan's with cilia are given this common name. _____

2.13 Photoautotrophs use this energy source to synthesize organic compounds. _____

2.14 One of the advantages of a membrane surrounding the nucleus is that this part of gene expression is restricted to the cytoplasm. _____

2.15 Mitochondria replicate themselves using this bacterial process (Two words) _____

2.16 In the endosymbiont theory what type of metabolism did the eukaryote cell have? _____

2.17 In billions of years the length of the Proterozoic eon. _____

2.18 Type of mutation when only one nucleotide is changed. _____

2.19 Halophile bacteria love this. _____

2.20 During the eight cell stage in the developing embry the cells above the equatorial plane shift; its this type of cleavage. _____

2.21 Name for the complex of genetic information and proteins that make up the chromosome. _____

2.22 Bacterial nuclear material is organized in the region. _____

2.23 Bacterial diversity is best seen in the different choices of electron acceptors used in respiration. _____

2.24 The Cambrian fauna were the first to do this tapped into a food resource on the oceans bottom that no one had been able to use. _____

2.25 A mutually beneficial relationship between two organism is referred to as this. _____

2.26 The Cambrian period marks the start of this the final geological eon. _____

Part three of the exam is on the next page

12 pts Part 3: Answer the following two questions in the space provided.

What are the Protostomia and what are the major events in the evolution of this animal taxon?

What is gene fixation and how does it come about; what are the consequences for a population that experiences it. What is the